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# Concerns of Environmental Persistence of Pesticides and Human Chronic Diseases

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The connection between exposure to pesticides, chemicals used to control pests, and incidence of the chronic diseases affecting public health has been under attention of scientists in the recent years. Chronic diseases arisen from unknown sources have been identified as the leading cause of death in the world or the health problems that negatively affect quality of life. Based on the first Global Status Report on Noncommunicable Diseases released by the World Health Organization (WHO) in 2010, cancer, cardiovascular disease, chronic respiratory diseases, and diabetes were announced of killing tens of millions people in 2008 and surprisingly most of them occurred under age of 60. Irrespective of identified risk factors like inheritance, physical inactivity, rich diet, smoking, and alcoholism, investigations continue to explore the role of environmental contaminants in developing these disorders [1].

In this regard, the issue of environmental pollution of pesticides seems more deleterious since these chemicals can enter the food chain of general population because of their persistence in the agricultural products. Pesticides have been designed to adversely affect living organisms [2], but the concerns over their health problems started to grow when they appeared as an integral part of the ecosystem because of the widespread use in the agriculture and health control programs in the world [3,4]. This is notable that use of these chemicals at the moment is inevitable and there is no suitable alternative for them and thus the expectation is to see them in usage at least more than decade. A large number of studies has been carried out on the association of pesticides with common human chronic diseases including cancer, neurodegenerative diseases like Parkinson, Alzheimer, and Amyotrophic Lateral Sclerosis (ALS), chronic respiratory diseases mostly asthma and Chronic Obstructive Pulmonary Disorder (COPD), diabetes, and cardiovascular diseases. Regardless of the result, the huge body of surveys is enough to create concerns on the persistence of pesticides in the living environment. Most of these investigations have found a link between exposure to pesticides and elevated rate of related disease so that considering pesticides as a risk factor for developing chronic diseases seem much likely [3-8]. Studies exploring the disease process in association with toxic effects of pesticides have largely uncovered the mechanisms by which exposure to pesticides can induce and develop chronic disorders. The well-known phenomenon, oxidative stress, as an imbalanced cellular redox homeostasis has been identified in most pesticides' toxicities which can develop chronic diseases by promoting other pathways like inflammation, endoplasmic reticulum stress, proteotoxicity, genotoxicity, and epigenetic modifications [9,10]. Most of these events have been detected in exposure to certain pesticides in vitro and in vivo. Altered gene expression profile resulted from these mechanisms are indicating that the following processes are compensatory in benefit of cell survival and usually provoked in response to the situations threatening homeostasis like exposure to pesticides. But from the whole organism standpoint, these events are maladaptive processes which can result in the common health defects particularly chronic disorders [11]. Some pesticides have also been identified as endocrine disruptors which can promote diseases in which the homeostasis of endocrine system becomes upset [12].

However, the potential role of pesticides in developing human chronic diseases is not hidden anymore and uncovering more details in this area has been the scope of numerous researches at the moment. Unfortunately the link between environmental use of pesticides and incidence of chronic diseases cannot be diagnosed easily and much strong retrospective epidemiological studies are needed. But regarding the progress in knowledge on pathophysiology of some diseases and mechanism of action of some pesticides, it is not surprising to state that the link exists and thus protective measures or policies are needed to prevent that kind of silent poisoning. Chronic diseases are a serious health problem of current century and thus grabbing the time for lowering the risk of pesticides is crucial to prevent the issue becoming a global crisis.

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